

AN ACUTE EYE IRRITATION STUDY OF
IN ALBINO RABBITS

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This summary of data and conclusions is based upon the sample received. Additional studies may be required as specific uses and formulations are developed or if process changes occur.

ABSTRACT

An acute study was designed to evaluate the eye irritation potential of in New Zealand white rabbits. The procedure followed fulfills the requirements outlined in the "O.E.C.D. Short-Term and Long-Term Toxicology Groups Final Report," adopted in May, 1981. A single instillation (0.1 ml) of undiluted into the eyes of rabbits followed by washing resulted in slight to marked conjunctival redness, swelling and discharge, iritis and corneal opacity persisting for several days. Examination after seven days showed two rabbits with corneal vesicles. All rabbits had slight corneal opacity and three rabbits had corneal vascularization when examined at 21 days after treatment. One rabbit continued to show signs of severe corneal damage with some permanent corneal scarring even after 21 days. One rabbit died during the study for reasons not believed to be compound related. According to O.E.C.D. definition and under the conditions of this test, is a severe irritant to the eyes of rabbits. Direct eye contact with this material may result in vision impairment or permanent loss of vision and therefore, precautions should be taken to avoid direct eye contact with this material during its industrial use.

*Amine siloxane hydrolyzate

ORIGINAL REPORT

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TEST MATERIAL

A clear, colorless liquid identified as _____ was submitted to the Toxicology Department for the determination of eye irritation potential and an assessment of the industrial handling hazards associated with acute exposure. The procedure for testing this material was based on methods recommended in the "O.E.C.D. Short-Term and Long-Term Toxicology Groups Final Report," adopted in May, 1981.

METHOD

One group of six young male rabbits of the New Zealand white strain (Langshaw Farms, Augusta, Michigan) were employed for this study. Animals were kept in quarantine for seven days prior to initiation of the study and only suitable animals were selected for the experiment. All the rabbits were housed individually in clean, stainless steel cages that were free of particulate bedding material or other extraneous substances that could irritate the eyes. The animals were maintained on a standard PURINA® Rabbit Chow and water ad libitum. Each rabbit was identified by an individual permanent ear tag.

Twenty-four hours before test substance administration, both eyes of each animal were examined for preexisting corneal or conjunctival injury or irritation.

One-tenth of a milliliter (0.1 ml) of undiluted solution of _____ was instilled in the right eye of each of the rabbits. The instillation of the compound was facilitated by gently pulling the lower lid away from the eyeball to form a cup into which the test substance was dropped. The lids were gently held together for one second. The left eye remained untreated and served as a control. Treated eyes of three of the six rabbits were washed at four seconds and the remaining three rabbits were washed 30 seconds after the instillation. For both groups, the eyes were washed for five minutes with tepid, flowing tap water.

Behavioral changes of all animals were observed from the time of dosing for indications of pain and discomfort. Both eyes of all rabbits were examined at 1, 24, 48, 72 hours, 7, 14, and 21 days post instillation. Fluorescein stain was used at 24, 48, 72 hours, and 7 days reading. Eyes were examined by slit illumination for ocular reaction of the cornea, iris (internal effects) and conjunctivae and scored according to Table I. Eyes were also examined for any unusual effects of the lids and nictitating membrane. All animals were observed twice daily during the weekdays for mortality, general activity and signs of toxicity.

RESULTS

Tables II-V represent the eye irritation scores with time. A moderate pain response was observed in all rabbits immediately following the instillation of and showed moderate conjunctival redness with slight to moderate swelling after one hour. When examined at 24 and 48 hours following treatment, moderate eye irritation was observed in all rabbits in the form of moderate conjunctival redness and swelling with puruloid ocular discharge, marked iridal irritation and slight corneal opacity. Although some improvement was observed in the treated eyes of two rabbits at 72 hours, the remaining four animals still showed no significant change in ocular response. Two animals exhibited corneal vesicles after seven days (one from each wash group). Very slight to slight corneal opacity was seen in all rabbits at this examination. Iridal irritation subsided in all but one animal after seven days. One animal from the four second wash group was found dead on day 12. The animal had not been eating and the cause of death was not determined at the time of necropsy. After 21 days all rabbits still exhibited very slight corneal opacity with three of five rabbits still showing corneal vascularization. There appeared to be no significant differences in ocular response between eyes that were washed at 4 or 30 seconds after treatment.

All of the rabbits have shown a positive reaction as defined by the O.E.C.D. guidelines. Therefore, the eye irritation test performed with is regarded as positive. In addition, a total maximum mean irritation score value of 7.7/13.0 indicates that is a severe irritant to the eyes of rabbits.

CONCLUSIONS

Under the conditions of this test, is a severe irritant to the eyes of rabbits. Direct eye contact with this material may result in vision impairment or permanent loss of vision, therefore, precautions must be taken to avoid direct eye contact with this material during its industrial use. If contamination should occur, flush the eyes immediately with copious amounts of water for at least 15 minutes and obtain medical assistance.

REFERENCES

"O.E.C.D. Short-Term and Long-Term Toxicology Groups Final Report," adopted in May, 1981.

This Report constituted of pages 1-6, and
Tables I-V, signed this 9th day of
April, 1985.

Authors:

Approved By:

Toxicology Department

Typed By:

QUALITY ASSURANCE STATEMENT

This report represents data generated by the Toxicology Department,
This study was conducted according to
the EPA Toxic Substances Control; Good Laboratory Practices Regulations; 40
CFR, Part 797, Vol. 48, No. 230. The results of the report accurately reflect
the data generated. All raw data is located at

Study Started: February 12, 1985
Study Completed: March 5, 1985
Date Audited: February 12, 1985 and March 5, 1985
Report Issued: April 16, 1985

April 9, 1985
Date:

TABLE I

Grades for Ocular Lesions

CORNEA

Opacity: Degree of density (area most dense taken for reading)

No ulceration opacity.....	0
Scattered or diffuse areas of opacity (other than slight dulling of normal luster, details of iris clearly visible).....	1
Easily discernible translucent areas, details of iris slightly obscured.....	2
Nacreous areas, no details of iris visible, size of pupil barely discernible.....	3
Opaque cornea, iris not discernible through the opacity.....	4

IRIS

Normal.....	0
Markedly deepened rugae, congestion, swelling, moderate circumcorneal hyperemia, or injection, any of these or combination any thereof iris still reacting to light (sluggish reaction is positive).....	1
No reaction to light, hemorrhage, gross destruction (any or all of these).....	2

CONJUNCTIVAE

Redness (refers to palpebral ad bulbar conjunctivae excluding cornea and iris)

Blood vessels normal.....	0
Some blood vessels definitely hyperemic (injected).....	1
Diffuse, crimson color, individual vessels not easily discernible.....	2
Diffuse beefy red.....	3

Chemosis: Lids and/or nictitating membranes

No swelling.....	0
Any swelling above normal (includes nictitating membranes).....	1
Obvious swelling with partial eversion of lids.....	2
Swelling with lids about half closed.....	3
Swelling with lids more than half closed.....	4

TABLE II

Acute Eye Irritation Scores of Albino Rabbits Following the
Instillation of 0.1 ml and Washed at
4 Seconds after Exposure

Examining Interval After Each Instillation

Observations		No. Positive/No. Dosed						
Ocular Grading		1 Hr.	24 Hrs.	48 Hrs.	72 Hrs.	7 Days	14 Days	21 Days
I. <u>Cornea</u>								
Cornea Normal:	3/3							
Corneal Opacity:								
Very Slight						2/3	1/2*	1/2
Slight			3/3	3/3	3/3	1/3	1/2	1/2
Moderate								
Marked								
II. <u>Iris</u>								
Iris Normal:	3/3				1/3	2/2	2/2	2/2
Iridal Irritation:			3/3	3/3	2/3			
III. <u>Conjunctivae</u>								
Redness: Normal							1/2	2/2
Slight					1/3	2/3	1/2	
Moderate	3/3	3/3	3/3	2/3	1/3			
Marked								
Chemosis: Normal						2/3	2/2	2/2
Very Slight					1/3	1/3		
Slight	3/3	2/3	2/3	2/3				
Moderate		1/3	1/3					
Marked								
<u>Discharge:</u>								
Present		3/3						
Normal	3/3		3/3	3/3	3/3	3/3	2/2	2/2
<u>Necrosis or Ulceration</u>								
Present		3/3	3/3	2/3	1/3	2/2	2/2	
Not Present	3/3			1/3	2/3	2/2	2/2	

*One rabbit died on day 12 of the study.

TABLE III

Acute Eye Irritation Scores of Albino Rabbits Following the
 Instillation of 0.1 ml and Washed at
 30 Seconds after Exposure

Observations		Examining Interval After Each Instillation						
		No. Positive/No. Dosed						
Ocular Grading		<u>1 Hr.</u>	<u>24 Hrs.</u>	<u>48 Hrs.</u>	<u>72 Hrs.</u>	<u>7 Days</u>	<u>14 Days</u>	<u>21 Days</u>
<u>I. Cornea</u>								
Cornea Normal:	3/3							
Corneal Opacity:								
Very Slight						2/3	2/3	2/3
Slight			3/3	3/3	3/3			1/3
Moderate						1/3	1/3	
Marked								
<u>II. Iris</u>								
Iris Normal:	3/3					2/3	3/3	3/3
Iridal Irritation:			3/3	3/3	3/3	1/3		
<u>III. Conjunctivae</u>								
Redness: Normal						1/3	2/3	3/3
Slight				1/3	1/3	1/3		
Moderate	3/3	3/3		2/3	2/3	1/3	1/3	
Marked								
Chemosis: Normal						2/3	2/3	3/3
Very Slight	1/3			1/3	1/3			
Slight	2/3	1/3		1/3	1/3			
Moderate		2/3		1/3	1/3	1/3	1/3	
Marked								
<u>Discharge:</u>								
Present			3/3	1/3	1/3			
Normal	3/3			2/3	2/3	3/3	3/3	3/3
<u>Necrosis or Ulceration</u>								
Present			3/3	3/3	3/3	2/3	1/3	1/3
Not Present	3/3					1/3	2/3	2/3

TABLE IV

Acute Eye Irritation Scores of Albino Rabbits
Following the Instillation of 0.1 ml of
and Washed at 4 Seconds after Exposure

Mean Eye Irritation Scores^a of Reactions
at Indicated Time Intervals

Individual Tissue & Scoring Criteria	<u>1 Hr.</u>	<u>24 Hrs.</u>	<u>48 Hrs.</u>	<u>72 Hrs.</u>	<u>7 Days</u>	<u>14 Days</u>	<u>21 Days</u>
I. Corneal Opacity:	0.0	2.0	2.0	2.0	1.3	1.5	1.5
Score	0.0	2.0	2.0	2.0	1.3	1.5	1.5
II. Iridal Inflam- mation:	0.0	1.0	1.0	0.7	0.0	0.0	0.0
Score	0.0	1.0	1.0	0.7	0.0	0.0	0.0
III. Conjunctival Irritation:							
a. Redness	2.0	2.0	2.0	1.7	1.3	0.5	0.0
b. Chemosis:	2.0	2.3	2.3	1.7	0.3	0.0	0.0
Score	4.0	4.3	4.3	3.4	1.6	0.5	0.0
Total Scores ^b	4.0	7.3	7.3	6.1	2.9	2.0	1.5

^aScored According to Table I

^bMaximum Possible = 13.0

TABLE V

Acute Eye Irritation Scores of Albino Rabbits
Following the Instillation of 0.1 ml of
and Washed at 30 Seconds after Exposure

Mean Eye Irritation Scores^a of Reactions
at Indicated Time Intervals

Individual Tissue & Scoring Criteria	<u>1 Hr.</u>	<u>24 Hrs.</u>	<u>48 Hrs.</u>	<u>72 Hrs.</u>	<u>7 Days</u>	<u>14 Days</u>	<u>21 Days</u>
I. Corneal Opacity:	0.0	2.0	2.0	2.0	1.7	1.7	1.3
Score	0.0	2.0	2.0	2.0	1.7	1.7	1.3
II. Iridal Inflam- mation:	0.0	1.0	1.0	1.0	0.3	0.0	0.0
Score	0.0	1.0	1.0	1.0	0.3	0.0	0.0
III. Conjunctival Irritation:							
a. Redness	2.0	2.0	1.7	1.7	1.0	0.7	0.0
b. Chemosis:	1.7	2.7	2.0	2.0	1.0	1.0	0.0
Score	3.7	4.7	3.7	3.7	2.0	1.7	0.0
Total Scores ^b	3.7	7.7	6.7	6.7	4.0	3.4	1.3

^aScored According to Table I

^bMaximum Possible = 13.0